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ORIGINAL

INNOVATIVE APPROACHES TO DIGITAL MONITORING OF PHYSICAL FITNESS IN ATHLETES: A BIG DATA PERSPECTIVE

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ABSTRACT

Its clinical and translational usefulness for sports has increased due to the confluence of wearable technology, physiology, and semiconductor technology. It has been demonstrated that the identification and subsequent use of metrics relevant to and indicative of the athlete's physical performance, physiological state, biochemical makeup, and mental alertness lowers the risk of injury and enhances performance. It has also made it possible for team doctors and trainers to create athlete-centered protocols and treatment plans. In order to give a knowledge of wearable sensors for sports medicine, we address both commercially accessible devices and those that have been reported in scientific literature in this review. The paper determines that innovative approaches to digital monitoring of physical fitness in athletes. This paper's secondary goal is to find joint research opportunities between academic research groups, sports medicine health clinics, and sports team performance programs in order to increase the technology's usefulness in helping athletes return to play across a range of sporting domains. The use of wearables to track an athlete's metabolic profile and mental acuity is covered in a companion study. The overall research found that direct and significant link of innovative approaches on digital monitoring.

KEYWORDS: Innovative Approaches (IA), Digital Monitoring (DM), Physical Fitness (PF), Athletes (A)

1. INTRODUCTION

Numerous studies have demonstrated the effectiveness of fitness technology in motivating sedentary individuals to participate in fitness regimens.

According to a systematic review, several studies that employed a combination of technology-based physical activity treatments (web-based technologies, mobile phones, and accelerometers) showed favorable outcomes, including weight reduction and modifications in health risk behavior in sedentary adults (Jin & Zhan, 2024). According to a different research, pedometer users reported higher levels of physical activity by 27%. Walking programs that used pedometers were also linked to distinguished reductions in systolic blood pressure, body weight, and body mass index. Nowadays, a lot of fitness facilities and educational institutions provide interactive games to encourage kids, teens, and senior citizens to be physically active. When compared to traditional cycling at continuous, sub-maximal workloads, interactive video game riding dramatically raised steady-state HR and energy expenditure, according to Warburton and colleagues. Interactive games are not just for kids; they may also help adults and seniors maintain their health by raising their levels of physical activity, decreasing falls, improving balance, development functional independence, and lowering the risk of early impairment. After completing a three-month video dance intervention (30 minutes per session, twice weekly), the seniors' balance, mental health, and timed walking over a confined route improved. Fitness technology frequently makes use of behaviour modification strategies such goal-setting, social variables, feedback, and incentive (Yang et al., 2024). Addressing behavioral changes might improve the person's commitment to exercise. Giving feedback is crucial for monitoring objectives and raising activity levels. Fitness applications include feedback methods including text messages, reminders, and real-time notifications. When a goal is accomplished, fitness trackers may also vibrate, emit a sound, or show a pleasant face or celebratory message. Social media makes it simple for users to update their friends on their progress, which has been shown to be an excellent motivating tool. To encourage more physical exercise, some smartphone apps offer expert virtual reality coaching. In comparison to objective research methods, technology-based fitness tools are comparatively less expensive. Additionally, they are easy to use and give users clear, useful data. Research has shown that fitness trackers, such as the Fitbit, Fitbit Ultra, and Fitbit One worn on the wrist, offer adequate validity and dependability that is on par with research-standard devices in the lab. To urge their patients to be more active, physiotherapists and other medical experts might recommend the use of trackers and/or smartphone applications. A physiotherapist wrote this blog article, which examines how Pokemon Go could encourage physical activity (Qiu et al., 2023).

2. Literature Review

This exploration exhibits a Major Information Logical helped deep learning pattern to compelling athletic people medical care information the board with further developed exactness & accuracy. The exploration

discoveries of this study show that the technique introduced hither might possibly further develop exactness & accuracy & upgrade average even mistake in athletics information order & perception(Jin & Zhan, 2024). Scholars plan to improve competitors' exhibition, streamline preparing systems, & illuminate dynamic cycles. Also, researchers recognize difficulties & suggest answers to incorporating such innovations toward contemporary games investigation rehearses. This study gives a complete examination of the verifiable setting & development of execution investigation in athletics scientific discipline, featuring contemporary strategies' benefits & restrictions. It dives toward the groundbreaking capability of man-made intelligence, computer simulation, extended reality, & information graphics, presents experiences toward in what way these devices might be coordinated toward a hypothetical pattern(Cossich et al., 2023). Studies gives an outline of different sorts of astute habiliments & their uses in wellbeing & athletics, classifies AI calculations, & presents the remote corpse zone detector organization utilized to correspondence in habiliment detectors. Also, researchers talk about possible difficulties & advancement headings that might form the eventual fate of shrewd habiliments & present compelling answers toward their proceeded with improvement(Yang et al., 2024). Scholars planned to introduce the present status of man-made intelligence & machine learning uses in athletics scientific discipline, explicitly in the space of wound expectation, execution improvement, & restoration. Researchers additionally investigate the difficulties of integrating computer-based intelligence & machine learning toward athletics & recommend headings to prospective exploration. Man-made intelligence & machine learning might be helpful toward the anticipation, recognition, conclusion, & therapy of medical issue(Reis et al., 2024). Studies means to give a hearty games clinical benefit enveloping continuous wellbeing observing & information impelled bits of knowledge. Controlled via the impressive conveyed processing stage Flash, it proficiently oversees broad athletics information produced over preparing & occasions, working with moment wellbeing assessments(Zhao et al., 2024). Studies shows the progressions brought about via the utilization of innovations with regards to huge information & athletics examination based on a methodical writing survey in proficient soccer. Studies outcomes demonstrate that large information & athletics examination became significant devices in proficient soccer & may build the seriousness of expert soccer maces. However, scholars methodical writing survey as well exhibits that latest advancements have danger possibilities to various partner gatherings(Herberger & Litke, 2021). Studies investigates the computerized developments utilized in superior execution athletic & in what way athletics, groups, & competitors gain from such progressions. As each development achieves alteration, the benefits & dangers of computerized advancements in superior execution athletic are examined. Finally, the necessity to inspect the limit of nations to put resources toward athletic advancements, also the moral difficulties that such innovations address

in athletic are examined(Sotiriadou, 2022). Studies expects to provide a concise outline of the prospective that computerized advances may have to medical services suppliers & sufferers in the medical act of athletics medication. Because of the variety & consistently altering essence of this area, researchers will momentarily survey different regions trying to provide pursuers an overall openness toward the scene rather than a careful, profound survey of one subject. Additional examination will 'be important to demonstrate the way that conversion to digital uses might better be utilized to sufferer therapies(Rigamonti et al., 2020). Studies plans to survey the speedy alterations happening in the athletics area, especially the ongoing examples & improvements that're resulting progressive alterations in the area. It additionally presents data on late headways influencing the business' prospective route. 3 fields of development are featured in this review: athletics contraptions, information examination, & innovation coordination. Ultimately, it provokes watchers to better deeply study the subject & investigate the potential implications & prospective headings of such upgrades in the athletics area(Li et al., 2024). The study momentarily audits the connection among athletic & Large Information prior to investigating few conceivable exemplar changes in the space of athletics landscape. Studies as well contends that another worldview may altogether affect the bearings of exploration in the space of athletics landscape(Tian, 2020). The points of this study are to sum up & assess the writing on competitors' expanded weakness to psychological chronic sickness & computerized emotional wellness arrangements being supplement to counteraction & mediation, & to exhibit connections among competitor emotional wellness issues & strength also computerized emotional wellness veiling & following, & quicker & best therapy calculations. Competitors are in danger sub-group to psychological wellness issues. Although, a subset of significant degree competitors showed a flexibility that assisted them with decidedly changing following a time of overpowering pressure(Balcombe & De Leo, 2020). This survey will feature authentic & provide developments along specific spotlight on mechanical developments in athletics nourishment that're supposed to propel the area toward the forthcoming. Without a doubt, the advancement & allocation of something else "enormous information," coordinating area-founded estimations, bringing about greater environmentally legitimate proof to viability & customized solutions, are prospective vital chances to additional development the area of athletics nourishment(Jonvik et al., 2022). The target of this research is to give medical care ceremonies toward the unhealthy also sound populace over distant checking utilizing smart calculations, apparatuses, & procedures with quicker investigation & master mediation to best therapy proposals. Studies intends an original savvy medical care enormous information structure to distantly observing actual day to day exercises of solid & unfortunate populace(Syed et al., 2019). Researchers analyzes the thrilling prospects guaranteed to the athletics climate via latest

advances like large information, computer-based intelligence, & Quantum figuring, talked about thus. Collectively & independently, the advances' ability to additional exact information assortment & examination may upgrade athletics-associated navigation & increment association execution in numerous fields. Ultimately, it investigates the elements past innovation that impact person's profound association in & close to home connection to endlessly athletics associated occasions(Torgler, 2023). Studies featured the exploration difficulties & possibilities in numerous assorted regions, toward the two scholarly community & business. Besides, researchers distinguished the digital twin models & instruments that help its fruitful turn of events. At long last, scholars planned a referral paradigm toward a simulated intelligence-machine learning & large information empowered computerized biparous framework to additional aide modern engineers in laying out digital twins that may form their frameworks more brilliant, smart, & progressively versatile to evolving circumstances(Rathore et al., 2021). Studies explain that huge information & imaginative examination strategies are 2 quickly advancing patterns that're changing the way in which scholars' direct exploration in athletic administration. Hence, a thorough utilization of modern creative procedures may essentially form the fate of game administration investigation. Although, scholars should practice alert while thinking about the spring & pretreated of the information before employing progressed logical procedures(Mamo, 2023). Studies tends to the connection among the current advancement of the "savvy" arena & altering standards of development in athletics. Researchers infer that the savvy arena, verbalized the two in a real sense & metaphorically as an "subsistence research facility of development," usurps athletic as a valuable theme to influence more extensive social discussions nearby enormous information & Spatialize latest procedures of societal requesting over a parametrically & methodical meaning of predictability(Yang & Cole, 2022). The discoveries of the exploration demonstrated that the clearest contrasts in psychological well-being among learners who utilized programmed cautioning & the people who didn't utilize programmed cautioning were: wretchedness, uneasiness, aggression, fear, & paranoia. Along the backing of simulated intelligence & Large information there's a steady checking & advancement impact on English instruction learners' emotional wellness(Long & Lin, 2024). The study dives toward the complicated connection among huge information, distributed computation, & man-made reasoning, revealing insight into their principal ascribes & reliance. Across fastidious numerical examinations & execution evaluations, coordinating simulated intelligence with enormous information arises as an integral asset for upgrading dynamic in athletics. This examination highlights the cooperative energy amid such advances & prepares for inventive paths to deal with athletics-associated direction & execution upgrade(Eid et al., 2024). This exploration's discoveries exhibit that internet of things information, for this situation, shrewd indoor regulators along distant movement detectors,

is a reasonable choice to quantify populace degree wellbeing pointers. The effect of the populace degree conduct alterations because of the Coronavirus epidemic may be supported same following arrangement unwinding & essentially influences corporeal & psychological well-being. Such creative information-sets may fortify the current general wellbeing observation component via giving ideal & different information to general wellbeing authorities(Sahu, 2022). The reason for this study isn't to sum up & dissect the utilization of PC use in athletics diligence, however to concentrate on single part of athletics preparing, involving PC calculations being the center innovation to examine the directions of exploration items. The coordination & advancement of data innovation & athletics is basically the reason for advancing games improvement over virtual experience & computation of athletic abilities, athletics diligence, athletics preparing, & actual schooling(Lang, 2020). Studies endeavors to foster an athletics prescient investigation framework based on man-made intelligence & large information. This research investigates the job of computer-aided testing & enormous information in the games business. The contemporary study standing of athletics prescient examination is investigated over a writing explore. Consequently, the examination of the presentation of the intended framework is done. The outcome of the review will empower the utilization of man-made intelligence & Large information in athletics(Tan, 2023). Studies aim was to decide the advancement of the logical exploration technique in the area of Actual Schooling & Athletic Scientific Discipline. The logical examination technique was brought out via strategically passing over the phases of tending to the job tasks inside the bibliographical review, humanistic study investigation & logical line of reasoning. The hypothetical information was employed as per the momentum specific writing, the examination of the assessments of the trained professionals & the utilization of the individual involvement with the employed & advancement logical exploration(Potop et al., 2023). Scholar studies reveal that ideal athletics execution obliges a harmony among serious preparation & satisfactory sleep. The capacity of computer-based intelligence to examine difficult databases carries advancement toward the observing & improvement of competitor preparing phases. What's more, the review exhibited the pattern's adequacy continuously checking execution, further developing the thinking skills of the two mentors and competitors. The discoveries of this study feature the progressive capacity of simulated intelligence in athletics scientific discipline, providing a forthcoming where information determined strategies extraordinarily improve competitor preparing & execution administration(Biró et al., 2024). Studies gives another viewpoint & mention toward the prospective exploration of academy physical education & offers help toward the new generation of Information Technology to enable the shrewd administration of academy physical activity. It is recommended that researchers ought to focus closer on the development & examination of smart school physical activity, to understand the shrewd administration of academies

physical activity & advance its top notch improvement (Deng et al., 2023).

Table 1: The Result of Paired Samples Statistics

PAIRED SAMPLES STATISTICS						
		MEAN	N	STD. DEVIATION	STD. MEAN	ERROR
PAIR 1	Innovative Approaches	1.4833	60	.59636	.07699	
	Digital Monitoring	1.6667	60	.65527	.08459	
PAIR 2	Design Thinking	1.4833	60	.59636	.07699	
	Physical Fitness in Athletes	1.6167	60	.61318	.07916	
PAIR 3	Future Thinking	1.5000	60	.59660	.07702	
	Digital Monitoring	1.6667	60	.65527	.08459	
PAIR 4	. Crowdsourcing	1.5000	60	.56748	.07326	
	Physical Fitness in Athletes	1.6167	60	.61318	.07916	
PAIR 5	Hackathons	1.6167	60	.61318	.07916	
	Physical Fitness in Athletes	1.6167	60	.61318	.07916	
PAIR 6	Innovative Approaches	1.4833	60	.59636	.07699	
	Physical Fitness in Athletes	1.6167	60	.61318	.07916	

The above result of table 1 represent that descriptive statistical analysis result describe that mean values, the median rates, the standard deviation, and also that explain the significant values of each variables included dependent and independent. The first pair is innovative approaches and digital monitoring result shows that its mean value is 1.4833, 1.6667 result shows that positive average value of mean. The standard deviation rate is 59% and 65% deviate from mean. The significant value is 76% and 84% significantly level between them. the pair 3 is future thinking and digital monitoring result shows that its mean value is 1.5000 and 1.6667 its shows that positive average rate. The standard deviation rate is 59% and 65% deviate from mean. The pair 4 shows that crowdsourcing and physical fitness in athletes result shows that its mean value is 1.5000 and 1.6167 result shows that positive average value of mean. The standard deviation rate is 56%, 61% deviate from mean. The significant value is 7% respectively. The pair 5 in between hackathons and physical fitness in athletes result shows that its mean value is 1.6167 the standard deviation rate is 61% deviate from mean. The pair 6 is innovative approaches and physical fitness in athletes result shows that its mean value is 1.4833 and 1.6167 result shows that positive average value of mean. The standard deviation is 59% and 61% deviate from mean values. The significant rate is 76% and 79% significant value between them.

2.1 Temperature/Heat Flux Sensors

In situations where hyperthermia is a concern, such as high temperature/humidity regions and interior spaces without air conditioning, it is

crucial to monitor core body temperature. Unusual fluctuations in core temperature during an athlete's early transition to sports are a further cause for worry. Sports medicine has had a major issue in accurately measuring core body temperature. It is possible to measure core temperature while participating in sports. It has been demonstrated that external temperatures are not a good indicator of core body temperature. This fact has been gotten around by more recent commercial temperature sensors that use telemetric core temperature sensors, which rely on an edible capsule that uses radiofrequency to communicate data systems. Every temperature sensor design has its own set of drawbacks. The validity and dependability of ingestible sensors are impacted by the consumption of cold water and meals. When measuring temperature and determining energy expenditure during high-intensity exercise, armbands and skin-based dermal temperature sensors might irritate skin and are not very reliable.

2.2 Integrated Sensors

Multimodal integrated sensors are designed to be used in both solo and team fitness exercises. To gather physiologic and movement profiles of athletes, the manufacturers Zephyr and Catapult combine GPS technology with a variety of changeable sensor components. The Catapult device is a tiny sensor that may be fastened to a jersey or protective clothing and is most frequently positioned between the shoulder blades. In addition to an ECG monitor, the Zephyr devices also include a respiration rate meter. Continuous monitoring is provided by the Zehphyr BioPatch, a wireless device that connects to disposable ECG electrodes. Despite being comparatively tiny, the Zephyr device necessitates a strap that is worn over the shoulder and over the chest, which might be difficult to do when wearing safety gear like shoulder pads over the top. For precise measurements of heart rate and breathing, the straps are indispensable.

Table 2: The Result of Paired Samples Correlations

PAIRED SAMPLES CORRELATIONS				
		N	**CORRELATION**	**SIG.**
PAIR 1	Innovative Approaches & Digital Monitoring	60	-.101	.442
PAIR 2	Design Thinking & Physical Fitness in Athletes	60	.052	.695
PAIR 3	Future Thinking & Digital Monitoring	60	-.130	.322
PAIR 4	Crowdsourcing & Physical Fitness in Athletes	60	-.073	.579
PAIR 5	Hackathons & Physical Fitness in Athletes	60	-.037	.780
PAIR 6	Innovative Approaches & Physical Fitness in Athletes	60	-.087	.507

The above result of table 2 demonstrate that pair correlation analysis result shows the correlation value also that significant value of each pair. The first pair is innovative approach and digital monitoring result shows that its

correlation rate is -0.101 the significant value is 44% significant value between them. similarly, the pair 3 shows negative but its 32% significant value between them. the pair 4 shows that 57% significant rate the correlation value is -0.073 respectively. The pair 5 its shows that hackathons and physical fitness athletes result shows that its significant value is 78% the correlation value is -0.037 respectively. The pair 6 shows that innovative approaches and physical fitness in athletes result shows that its correlation value is -0.087 the significant value is 50% significantly rates between them.

Table 3: The Result of ANOVA[a]

ANOVA[A]						
MODEL		**SUM OF SQUARES**	**DF**	**MEAN SQUARE**	**F**	**SIG.**
1	Regression	1.893	6	.316	.824	.556[b]
	Residual	20.290	53	.383		
	Total	22.183	59			
a. Dependent Variable: Physical Fitness iIn Athletes						
b. Predictors: (Constant), Digital Monitoring, Crowdsourcing, Design Thinking, Hackathons, Future Thinking, Innovative Approaches						

The above result of table 3 demonstrate that ANOVA test analysis result shows that sum of square values, the mean square values, the F statistic also that it explains the significant rate of each model related to the residual and regression model between the digital monitoring and physical fitness in athletes. The regression model shows that its sum of square value is 1.893 the mean square rate is 31% the significant rate is 55% significantly levels between them. the residual model shows that its sum of square values 20.290 the total sum of square rate is 22.183 respectively. The mean square value is 38% average square rate between them.

Table 4: The Result of Coefficients[a]

COEFFICIENTS[A]						
MODEL		**UNSTANDARDIZED COEFFICIENTS**		**STANDARDIZED COEFFICIENTS**	**T**	**SIG.**
		B	**STD. ERROR**	**BETA**		
1	(Constant)	1.462	.598		2.443	.018
	Innovative Approaches	-.048	.144	-.047	-.332	.741
	Design Thinking	.020	.146	.020	.139	.890
	Future Thinking	-.072	.143	-.070	-.507	.614
	. Crowdsourcing	-.067	.147	-.062	-.458	.648
	Hackathons	.006	.137	.006	.046	.964
	Digital Monitoring	.237	.127	.254	1.873	.067
a. Dependent Variable: Physical Fitness in Athletes						

The above result of table 4 demonstrate that linear regression analysis result shows the unstandardized coefficient values included beta value and standard error value of each independent variable result shows that t statistic value also that significant value of each variables the innovative approaches is main independent variable result shows that its beta value is -0.048 the standard error value is 0.144 the t statistic rate is -0.332 the significant rate is 74% significantly levels between them. the design thinking shows that its beta value is 0.020 the t statistic value is 13% the significant value is 89% significantly level between them. the future thinking is another independent variable result shows that the t statistic value is -0.507 the significant rate is 61% significantly levels between them. the crowdsourcing is another variable result describe that 64% significant value the T statistic value is -0.458 respectively. The hackathons are another independent variable result shows that its t statistic value is 0.046 the significant value is 96% significantly levels between them. The digital monitoring is another independent variable result describe that its beta value is 0.237 the t statistic value is 1.873 the significant value is 0.067 its shows that positive and 6% significant levels in between digital monitoring and physical fitness in athletes (Figure 1).

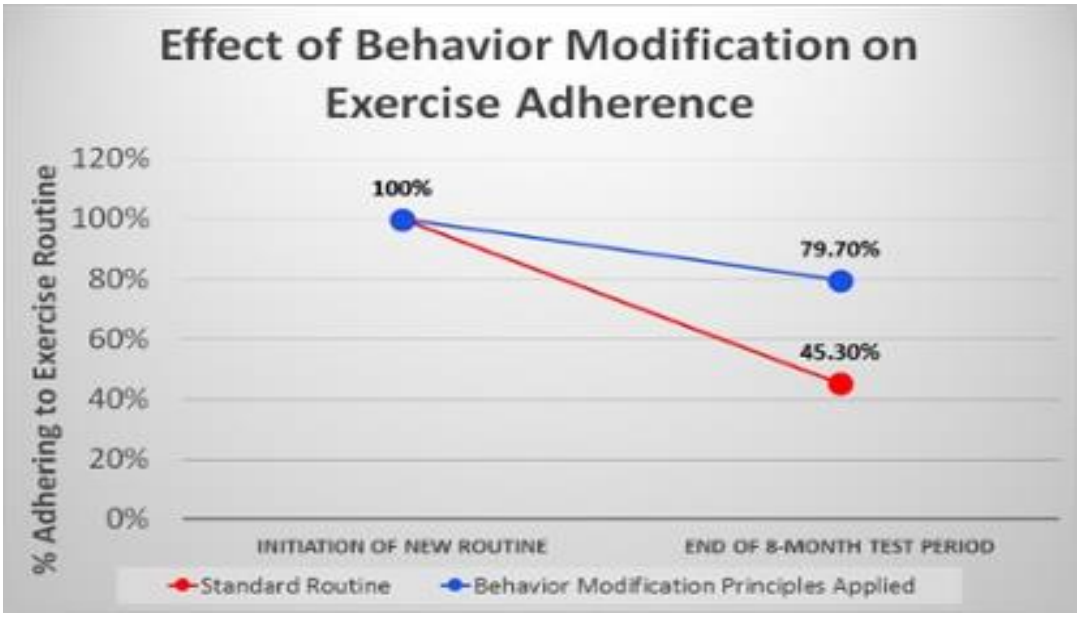

Figure 1: Using the right innovation method

2.3 Design Thinking

"The end user's demands are the main focus of design thinking. Just put yourself in their position, show empathy, and then come up with something new. Maria describes the concept of the Design Thinking process in this way. The four stages of the approach—understanding the problem, defining the problem, creating solutions, and solving the problem—were created in the 1990s by the design firm IDEO. "Agility is what distinguishes Design Thinking," Maria explains. "You jump between phases during the innovation process, always

keeping the users in mind." During the first two stages of innovation, a wide range of alternatives and ideas are collected through an open and diversified brainstorming process. After that, the issue is clarified and narrowed down. Convergent linear thinking is used at this stage to help choose original concepts from the pool of possibilities and turn them into solutions.

2.4 Future Thinking

In order to predict future trends, this entails creating a variety of future scenarios. This creates fresh viewpoints and areas of action for strategic decision-making. We frequently find it challenging to envision how particular facets of our life may develop in the future. However, this is precisely the essence of Future Thinking," Maria says. Current social and technical advancements are the main topic. "Future Thinking is the path towards a way of thinking about the future, not just thinking about the future methodically." The most important questions are: How will these businesses develop in the future? In 10 years, what do we want to accomplish? This kind of thinking builds on original concepts rather than narrowing them down like Design Thinking does. There are a number of methods to get inspired without ending the creative process too soon, Maria says. For Design Thinking, Future Thinking might be a great place where you can begin.

2.5 Crowdsourcing

In her discussion on crowdsourcing, Maria also refers to the "intelligence of the masses." The phrase combines the words "crowd" with "outsourcing." The outside world is incorporated into the creative process through crowdsourcing. Maria explains, "We use this innovation method at Henkel to get creative input from both internal and external sources." This is the concept underlying the Henkel Co-Creation Hub, a collaborative effort between Henkel and the innovation platform Jovoto. In addition to the active involvement of external, worldwide talent, co-creation entails Henkel workers who contribute to the improvement or reinvestment of goods, services, and procedures.

2.6 Hackathons

The verb "hack" plus the word "marathon" combine to get the moniker "hackathon." A hackathon is an event where issues are solved in a short amount of time, as the name implies. Software developers hosted the first hackathons, according to Maria. However, this approach to innovation is being used in many different domains, such as urban planning and the German government's hackathon to combat the coronavirus. Henkel also use this technique: The "Henkel Xathon" is an annual concept hackathon for female entrepreneurs that has been going on since 2019. According to Maria, "the participants come together in small groups and develop an innovative product or business model." "Hackathons are an amazing way to innovate because of the spirit of the event

and the sense of community."

Table 5: The Result of Test Statistics

TEST STATISTICS							
	INNOVATIVE APPROACHES	DESIGN THINKING	FUTURE THINKING	CROWDSOURCING	HACKATHONS	DIGITAL MONITORING	PHYSICAL FITNESS IN ATHLETES
CHI-SQUARE	24.700[a]	24.700[a]	23.700[a]	25.200[a]	19.300[a]	14.800[a]	19.300[a]
DF	2	2	2	2	2	2	2
ASYMP. SIG.	.000	.000	.000	.000	.000	.001	.000

a. 0 Cells (0.0%) Have Expected Frequencies Less than 5. The Minimum Expected Cell Frequency is 20.0.

The above result of table 5 demonstrates that test statistical analysis result represents the chi square result of each variables included dependent and independent. The innovative approaches are main independent variable its chi square rate is 24.700 the design thinking shows that 24.700 the future thinking shows 23.700 positive chi square the physical fitness in athletes shows that chi square value is 19.300 positively affect between them. the overall significant value is 0.000 shows that 100% significant rates with each other.

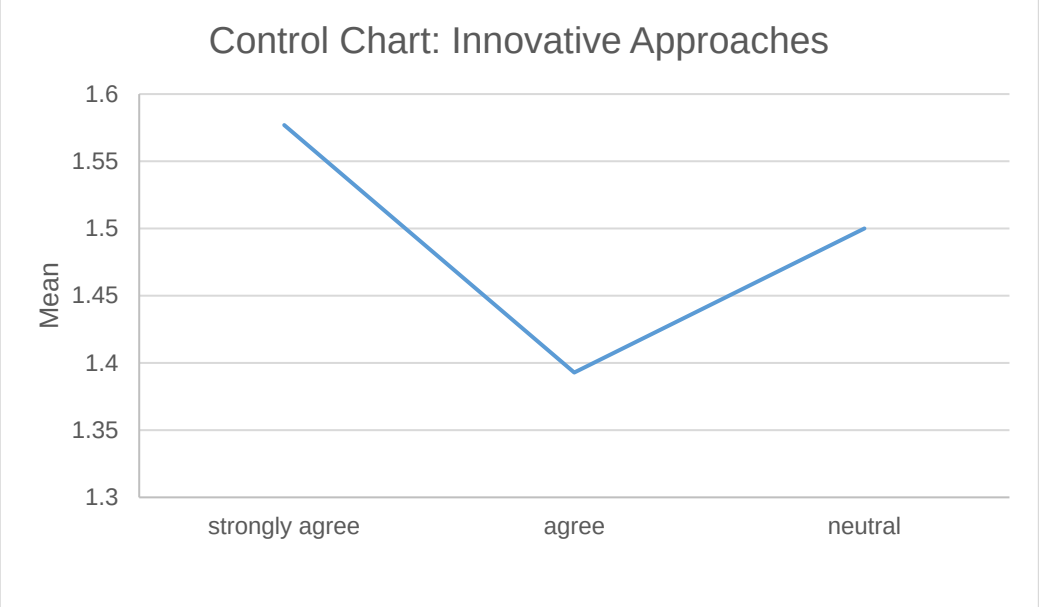

Figure 2: Control chart

The above graph of figure 2 represents that control chart analysis result

shows that vertical side present mean values which is start from 1.3 and end at 1.6 levels. The horizontal side shows strongly agree, agree and neutral levels of innovative approaches.

Table 6: The Result of Bayesian Estimates of Coefficients[a,b,c,d]

BAYESIAN ESTIMATES OF COEFFICIENTS[A, B, C, D]					
PARAMETER	**POSTERIOR**			**95% CREDIBLE INTERVAL**	
	MODE	**MEAN**	**VARIANCE**	**LOWER BOUND**	**UPPER BOUND**
DIGITAL MONITORING = STRONGLY AGREE	1.537	1.537	.016	1.290	1.783
DIGITAL MONITORING = AGREE	1.366	1.366	.016	1.119	1.612
DIGITAL MONITORING = NEUTRAL	1.533	1.533	.043	1.126	1.941
a. Dependent Variable: Innovative Approaches					
b. Model: Digital Monitoring					
c. Regression Weight Variable: Physical Fitness in Athletes					
d. Assume Standard Reference Priors.					

The above result of table 6 demonstrate that parameters analysis result describes that mode values, the variance rates, also that 95% credible related to lower interval and upper interval between them. the first parameter is digital monitoring = strongly agree the variance rate is 0.016 the lower bound value is 1.290 and 1.783 respectively. The digital monitoring = agree shows that variance value is 0.016 respectively. The third parameter is digital monitoring= neutral level result shows that its variance rate is 0.043 the lower bound value is 1.126 and upper bound value is 1.941 respectively.

3. Conclusion

Athlete monitoring in sports medicine has been greatly impacted by the advancement of wearable sensor technologies. During training and competitive sports, wearable sensors give coaches, trainers, and doctors a way to track movement and physiological indicators in real time. These metrics may be used to check for possible injury reasons including tiredness and concussions, identify position-specific movement patterns, and create more effective sports-specific training regimens for performance optimization.

4. Barriers/Future Directions

The three biggest issues facing fitness technology are adherence, accuracy, and accessibility. Compared to more active users, less active users are more likely to eventually give up using these gadgets and revert to their previous behaviours. According to some estimates, almost 50% of fitness

tracker users stop using their gadgets within the first month. It is promising that fitness technology frequently incorporates behavioral tactics like action planning and barrier detection to encourage adherence. These techniques would enable the user to look at their daily routine and identify periods when they may exercise more. After that, individuals may devise a detailed plan for boosting their exercise levels. Exercise self-efficacy and perceived control over exercise practices may both be raised with the use of these behavioral techniques. There is disagreement on where on the body to place the tracker; certain places are more accurate than others, and suggested locations may alter as people age. When compared to researcher-measured step counts and estimations of energy expenditure (EE), Diaz and colleagues also showed that the Fitbit Flex and Fitbit One worn on the waist and hip were dependable. They also suggested that the hip monitor was more accurate than the wrist. There are a few practical ways to give fitness trackers to big, varied crowds. For example, a lot of businesses have begun giving their staff members fitness monitors for free or at a discounted rate. According to one research, fitness trackers reduced the number of sick days used and enhanced productivity, indicating the significant potential if more businesses embraced them. According to recent studies, a large number of physicians are now recommending exercise to their patients who suffer from long-term diseases like diabetes, high blood pressure, or heart disease. Doctors and patients could monitor daily activity, as well as other metrics like food, heart rate, or sleep, if fitness trackers were covered by health insurance. These kinds of systems could be able to link patients and physicians in ways that weren't previously feasible.

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